Fig. 1-1

SEQ ID NO:1

GTTCAAGAATCAGTTTTCTTTTTATAAGGGCTAAAATCACTTATTTTGGCTTTTTTACCCCATATTGTAGGGTG
GATCTCGAAAGATATGAAAGATCTCCCTCCAAGCCGTACATACGACTTTCATCGAATACGGCTTTCCGCAGAAT
TCTATATGTATCTATGAGATCGAGTATGGAATTCTGTTTACTCACTTTAAATTGAGTATCCGTTTCCCTCCTTT
TCCTGCTAGGATTGGAAATCCTGTATTTTACATATCCATACGATTGAGTCCTTGGGTTTCCGAAATAGTGTAAA
AAGAAGTGCTTCAAATCATTGCTATTTGACTCGGACCTGTTCTAAAAAGTCGAGGTATTTCGAATTGTTTGTTG
ACACGGACAAAGTCAGGGAAAACCTCTGAAATTTTTTCAATATTGAACCTTGGACATATAATAGTTCCGAATCG
AATCTCTTTAGAAAGAAGATCTTTTGTCTCATGGTAGCCTGCTCCAGTCCCCTTACGAAACTTTCGTTATTGGG
TTAGCCATACACTTCACATGTTTCTAGCGATTCACATGGCATCATCAAATGATACAAGTCTTGGATAAGAATCT
ACAACGCACTAGAACGCCCTTGTTGACGATCCTTTACTCCGACAGCATCTAGGGTTCCTCGAACAATGTGATAT
CTCACACCGGGTAAATCCTTAACCCTCCCCCCTCTTACTAAGACTACAGAATGTTCTTGTGAATTATGGCCAAT
ACCGGGTATATAAGCAGTGATTTCAAATCCAGAGGTTAATCGTACTCTGGCAACTTTACGTAAGGCAGAGTTTG
GTTTTTTTGGGGTGATAGTGGAAAAGTTGACAGATAAGTCACCCTTACTGCCACTCTACAGAACCGTACATGAG
ATTTTCACCTCATACGGCTCCTCGTTCAATTCTTTCGAAGTTATTGGATCCTTTTCCGCGTTCGAGAATCCCCT
CCCTTCTTCCACTCCGTCCCGAAGAGTAACTAGGACCAATTTAGTCACGTTTTCATGTTCCAATTGAACACTTT
CCGTTTTTGATTATTCTCTTTACCAAACATATGCGGATCCAATCACGATCTTATAATAAGAACAAGAGATCTTT
CTCGATCAATCCCCTTGCCCCTCATTCTTCGAGAATCAGAAAGATCCTTTTCAAGTTTGAATTTGTTCATTTGG
AATCTGAGTTCTTCTACTTCATTATTTATTTAATATCAATATTTTTGCCTCTCTTTTTTTTTATATTATTCCTTA
AGTCCCATAGGTTTGATCCTTTAGAATTGGACTCATTTTCTCATTGAGCGAAGGGTACGAAATAAATCAGATTG
ATTAAAAGCACTATGTGAAATATTCGGTTTTTTCCTCTTCCTCTATCCCATAGGTACAGTGTTTGAATCAATCG
AGAACCTTTTCTTCTGTCTGAATCGATATTATTCCATTCCAATTCCTTCCCGATACCTCTCAAGGAAAATCTCG
AATTGGATCCTAAATTGACGGGTTAGTGTGAGCTTATCCATGCGGTTATGCACTCTTCGAATAGGAATCCATTT
TCTGAAAGATCCTGGCTTTCGTGCTTTGGTGGGTCTCCGAGATCCTTTCGATGACCTATGTTGTGTTTGTTGAA
GGGATATCTATATAATACGATCGATTGCGTAAAGCCCGCGGTAGCAGTGGAACCGGGGAAAGTATACAGAAAAG
ACAGTTCTTTTCTATTATATATTATATTAGTCTTTTCTATTTAATTCATATTAGATTAGTCTTAGTTAGTGATC
CCGGCTTAGTGAGTCCTTTCTTCCGTGATGAACTGTTGGCGCCAGTCCTACATTTTGTCTCTGTGGACAGAGGA
GAAAAGGGGCTCCGCGGGAAGAGGATTGTACCGTGAGAGAAGCAAGGAGGTCAACCTCTTTCAAATATACAACA
TGGATTCTGGCAATGCAATGTACTTGGACTCTCATGTCGATCCGAATGAATCATCCTTTCCACGGAGGCAAATC
TTTGCCTGTTAGGTAACAGGATAGCAAGTTACAAACTCTGTCTCGGTAGGACATGGATCTCTATTACTATGAAT
TTCATAAATGAAGTAGTGAATGGTGGGGTTACCATTATCCTTTTTGTAGTGACGAATCCTGTATGTGTTCCTAA
GAAAAGGAATTTGTACATTTTTCGGGATCTCAAAGGAGCGTGGAAACACATAAGAACTCTTGAATGGAAATGGA
AAAGAGATGGAACTCCAGTTCCTTCGGAAATGGTAAGATCTTTGGCGCAAAAAAAGGGGTTGATCCGTATCATC
TTGACTTGGTTCTGCTTCCTCTATTTTTTTAATAATACCGGGTCGGGTTCTTCTCCTACCCGTATCGAATAGAA
CACGCTGAGCCAAATCTTCTTCATGTAAAACCTGCTTGATTTAGATCGGGAAAATCGTGTGGTTTTATGAAACC
ATGTGCTATGGCTCGAATCCGTAGTCAATCCTATTTCCGATAGGGACAGTTGACAACTGAATCCTATTTTCCCA
TTATTTTCATATCCGTAATAGTGCGAAAAAAAAGA**TTAATTAAGGCGCGCC**AGGCCCGGCCCCAAGTTGTTCAA
GAATAGTGTCGTTGAGTTTCTCGACCCTTTGCCTTAGGATTAATCAGTTCTATTTCTCGATGGGGGCAGGGAAG
GGATATAACTCACCGGTAGAGTGTCACCCTTGACGTGGTGGAAGTCATCAGTTCGAGCCTGATTATCCCTAAAC
CCAATGTGAGTTTTGATATTTTGATTTGCTACCCCGCCGTGATTGAATGAGAATGGATAAGAGGCTCGTGGGAT
TGACGTGAGGGGGCAGGGATGGCTATATTTCTGGGAGCGAACTCCGGGCGAATATGAAGCGCATGGATACAAGT
TAGGCCTTGGAATGAAAGACAATTCCGAATCCGCTTTGTCTACGAACAAGGAAGCTATAAGTAATGCAACTATG
AATCTCATGGAGAGTTCGATCCTGGCTCAGGATGAACGCTGGCGGCATGCTTAACACATGCAAGTCGGACGGGA
AGTGGTGTTTCCAGTGGCGGACGGGTGAGTAACGCGTAAGAACCTGCCCTTGGGAGGGGAACAACAGCTGGAAA
CGGCTGCTAATACCCCGTAGGCTGAGGAGCAAAAGGAGGAATCCGCCCGAGGAGGGGCTCGCGTCTGATTAGCT
AGTTGGTGAGGTAATAGCTTACCAAGGCGATGATCAGTAGCTGGTCCGAGAGGATGATCAGCCACACTGGGACT
GAGACACGGCCCAGACTCCTACGGGAGGCAGCAGTGGGGAATTTTCCGCAATGGGCGAAAGCCTGACGGAGCAA
TGCCGCGTGGAGGTAGAAGGCCCACGGGTCATGAACTTCTTTTCCCGGAGAAGAAGCAATGACGGTATCTGGGG
AATAAGCATCGGCTAACTCTGTGCCAGCAGCCGCGGTAATACAGAGGATGCAAGCGTTATCCGGAATGATTGGG
CGTAAAGCGTCTGTAGGTGGCTTTTTAAGTCCGCCGTCAAATCCCAGGGCTCAACTCTGGACAGGCGGTGGAAA
CTACCAAGCTGGAGTACGGTAGGGGCAGAGGGAATTTCCGGTGGAGCGGTGAAATGCGTAGAGATCGGAAAGAA
CACCAACGGCCAAAGCACTCTGCTGGGCCCACACTGACACTGAGAGACGAAAGCTAGGGGAGCGAATGGGATTA

Fig. 1-2

(continued)
GATACCCCAGTAGTCCTAGCCGTAAACGATGGATACTAGGCGCTGTGCGTATCGACCCGTGCAGTGCTGTAGCT
AACGCGTTAAGTATCCCGCCTGGGGAGTACGTTCGCAAGAATGAAACTCAAAGGAATTGACGGGGGCCCGCACA
AGCGGTGGAGCATGTGGTTTAATTCGATGCAAAGCGAAGAACCTTACCAGGGCTTGACATGCCGCGAATCCTCT
TGAAAGAGAGGGGTGCCTTCGGGAACGCGGACACAGGTGGTGCATGGCTGTCGTCAGCTCGTGCCGTAAGGTGT
TGGGTTAAGTCCCGCAACGAGCGCAACCCTCGTGTTTAGTTGCCATCATTGAGTTTGGAACCCTGAACAGACTG
CCGGTGATAAGCCGGAGGAAGGTGAGGATGACGTCAAGTCATCATGCCCCTTATGCCCTGGGCGACACACGTGC
TACAATGGCCGGGACAAAGGGTCGCGATCCCGCGAGGGTGAGCTAACCCCAAAAACCCGTCCTCAGTTCGGATT
GCAGGCTGCAACTCGCCTGCATGAAGCCGGAATCGCTAGTAATCGCCGGTCAGCCATACGGCGGTGAATCCGTT
CCCGGGCCTTGTACACACCGCCCGTCACACTATGGGAGCTGGCCATGCCCGAAGTCGTTACCTTAACCGCAAGG
AGGGGGATGCCGAAGGCAGGGCTAGTGACTGGAGTGAAGTCGTAACAAGGTAGCCGTACTGGAAGGTGCGGCTG
GATCACCTCCTTTTCAGGGAGAGCTAATGCTTGTTGGGTATTTTGGTTTGACACTGCTTCACACCCAAAAAAGA
AGGGAGCTACGTCTGAGTTAAACTTGGAGATGGAAGTCTTCATTTCGTTTCTCGACAGTGAAGTAAGACCAAG

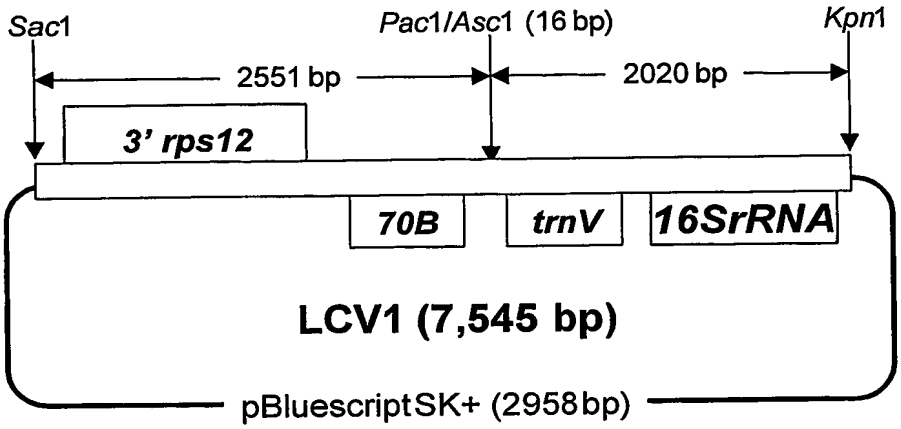

Sac1
Pac1/Asc1 (16 bp)
Kpn1
2551 bp
2020 bp
3' rps12
70B
trnV
16SrRNA
LCV1 (7,545 bp)
pBluescriptSK+ (2958bp)

Fig. 2

Fig. 3-1

```
LCV1 (SEQ ID NO:2):   1      gttcaagaatcagttttcttttttataagggctaaaatcacttattttggctttttttaccc 60
                             ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
tobac (SEQ ID NO:3):  100021 gttcaagaatcagttttcttttttataagggctaaaatcacttattttggctttttttaccc 100080
ribosomal protein S12 80                                                ^^^ K  P  K  K  V  G
(SEQ ID NO:41)

LCV1:                 61     catattgtagggtggatctcgaaagatatgaaagatctccctccaagccgtacatacgac 120
                             ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
tobac:                100081 catattgtagggtggatctcgaaagatatgaaagatctccctccaagccgtacatacgac 100140
ribosomal protein S12 78       Y  K~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~


LCV1:                 121    tttcatcgaatacggctttccgcagaattctatatgtatctatgagatcgagtatggaat 180
                             ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
tobac:                100141 tttcatcgaatacggctttccgcagaattctatatgtatctatgagatcgagtatggaat 100200
ribosomal protein S12 1      ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~


LCV1:                 181    tctgtttactcactttaaattgagtatccgtttccctccttttcctgctaggattggaaa 240
                             |||||||||||||||||||||||||||||||||||| ||||||||||||||||||||||||
tobac:                100201 tctgtttactcactttaaattgagtatccgtttccctcccttttcctgctaggattggaaa 100260
ribosomal protein S12 1      ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~


LCV1:                 241    tcctgtattttacatatccatacgattgagtccttgggtttccgaaatagtgtaaaaaga 300
                             ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
tobac:                100261 tcctgtattttacatatccatacgattgagtccttgggtttccgaaatagtgtaaaaaga 100320
ribosomal protein S12 1      ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~


LCV1:                 301    agtgcttcaaatcattgctatttgactcggacctgttctaaaaa-gtcgaggtatttcga 359
                             |||||||| |||||||||||||||||||||||||||||||||| ||||||||||||||||
tobac:                100321 agtgcttcgaatcattgctatttgactcggacctgttctaaaaaagtcgaggtatttcga 100380
ribosomal protein S12 1      ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~


LCV1:                 360    attgtttgttgacacggacaaagtcagggaaaacctctgaaatttttttcaatattgaacc 419
                             |||||||||||||||||||||||||||||||||||||||||||| ||||||||||||||||
tobac:                100381 attgtttgttgacacggacaaagtcagggaaaacctctgaaattatttcaatattgaacc 100440
ribosomal protein S12 1      ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~


LCV1:                 420    ttggacatataatagttccgaatcgaatctctttagaaagaagatcttttgtctcatggt 479
                             |||||||||||| ||||||||||||||||||||||||||||||||||||||||||||||||
tobac:                100441 ttggacatataagagttccgaatcgaatctctttagaaagaagatcttttgtctcatggt 100500
ribosomal protein S12 1      ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~


LCV1:                 480    agcctgctccagtcccccttacgaaactttcgttattgggttagccatacacttcacatgt 539
                             ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
tobac:                100501 agcctgctccagtcccccttacgaaactttcgttattgggttagccatacacttcacatgt 100560
ribosomal protein S12 1      ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~


LCV1:                 540    ttctagcgattcacatggcatcatcaaatgatacaagtcttggataagaatctacaacgc 599
                             ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
tobac:                100561 ttctagcgattcacatggcatcatcaaatgatacaagtcttggataagaatctacaacgc 100620
ribosomal protein S12 1      ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~


LCV1:                 600    actagaacgcccttgttgacgatcctttactccgacagcatctagggttcctcgaacaat 659
                             ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
tobac:                100621 actagaacgcccttgttgacgatcctttactccgacagcatctagggttcctcgaacaat 100680
ribosomal protein S12 59     ~~  S  R  G  Q  Q  R  D  K  V  G  V  A  D  L  T  G  R  V  I
```

Fig. 3-2

(continued)

```
LCV1:                        660    gtgatatctcacaccgggtaaatccttaaccctccccccctcttactaagactacagaatg 719
                                    ||||||||||||||||||||||||||||||||||| |||||||||||||||||||||||||
tobac:                       100681 gtgatatctcacaccgggtaaatccttaacccttccccctcttactaagactacagaatg 100740
ribosomal protein S12 39             H  Y  R  V  G  P  L  D  K  V  R  G  G  R  V  L  V  V  S  H

LCV1:                        720    ttcttgtgaattatggccaataccgggtatataagcagtgatttcaaatccagaggttaa 779
                                    ||||||| ||||||||||||||||||||||||||||||||||||||||||||||||||||
tobac:                       100741 ttcttgtaaattatggccaataccgggtatataagcagtgatttcaaatccagaggttaa 100800
ribosomal protein S12 19             E  Q  L  N  H  G  I  G  P  I  Y  A  T  I  E  F  G  S  T  L

LCV1:                        780    tcgtactctggcaactttacgtaaggcagagtttggtttttttggggtgatagtggaaaa 839
                                    |||||||||||||||||||||||||||||||||||       ||||||||||||||||
tobac:                       100801 tcgtactctggcaactttacgtaaggcagagtttggtttttttggggtgatagtggaaaa 100860
ribosomal protein S12 1               R  V  R  A  V  K  R  L  A  S  N  P  K  K  P  T  I  T

LCV1:                        840    gttgacagataagtcacccttactgccactctacagaaccgtacatgagattttcacctc 899
                                    ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
tobac:                       100861 gttgacagataagtcacccttactgccactctacagaaccgtacatgagattttcacctc 100920

LCV1:                        900    atacggctcctcgttcaattctttcgaagttattggatccttttccgcgttcgagaatcc 959
                                    |||||||||||||||||||||||||||| | ||||||||| ||||||||||||||||||
tobac:                       100921 atacggctcctcgttcaattctttcgaattcattggatcc-tttccgcgttcgagaatcc 100979

LCV1:                        960    cctcccttcttccactccgtcccgaagagtaactaggaccaatttagtcacgttttcatg 1019
                                    || ||||||||||||||| ||||||||||||||||||||||||||||||||||||||||||
tobac:                       100980 cc-cccttcttccactccgccccgaagagtaactaggaccaatttagtcacgttttcatg 101038

LCV1:                       1020    ttccaattgaacactttccgttttt--------------------
                                    ||||||||||||||| ||| |||||
tobac:                      101039 ttccaattgaacactgtccatttttgattattctcaaaggataa 101082

LCV1:  1045   gattattctctttaccaaacatatgcggatccaatcacgatcttata----ataagaaca 1100
              ||||||||||||||||||||||||||||||||||||||||||||||||||     | |||||||
tobac: 101083 gattattctctttaccaaacatatgcggatccaatcacgatcttatatataagaagaaca 101142

LCV1:  1101   agagatctttctcgatcaatccccttgcccctcattcttcgagaatcagaaagatcctttt 1160
              | |||||||||| |||||||||| ||||||||||||||| ||||| || ||||||||||
tobac: 101143 aaagatctttcttgatcaatccctttgcccctcattcttcaagaataaggaagatcctttt 101202

LCV1:  1161   tcaagtttgaatttgttcatttggaatctgagttcttctacttcattatttatttaatat 1220
              |||||||||||||||||||||||||||||| |||||||||||||| ||||||||||||
tobac: 101203 tcaagtttgaatttgttcatttggaatctgggttcttctacttcat-atttatttaatat 101261

LCV1:  1221   caatatttttgcctctctttttttttatattattccttaagtcccataggtttgatccttt 1280
               ||||||||  ||||||       |||| |||||||||||||||||||||||||||| |
tobac: 101262 gaatattttc-cctctctttttttttatatcattccttaagtcccataggtttgatcctgt 101320

LCV1:  1281   agaattggactcattttctcattgagcgaagggtacgaaataaatcagattgattaaaag 1340
              |||||| ||| |||||||||||||| |||| |||||||||||||||||||||| |||||
tobac: 101321 agaatttgacccattttctcattgaacgaaaggtacgaaataaatcagattgat-aaaag 101379
```

Fig. 3-3

(continued)

```
LCV1:  1341    cactatgtgaaatattcggttttt-----tcctcttcctctatcccataggt-----aca 1390
               || ||||||||| ||||||||||     |||||   | ||||||||||||     |||
tobac: 101380  taccatgtgaaatcttcggtttttccccttcctcgatccctatcccataggttaggtaca 101439

LCV1:  1391    gtgtttgaatcaatcgagaaccttttcttctgtctgaatcgatattattccattccaatt 1450
               ||||||||||||||| |||||||||||||||||| |||||||||||||||||||||||| |
tobac: 101440  gtgtttgaatcaatagagaaccttttcttctgtatgaatcgatattattccattccaaat 101499

LCV1:  1451    ccttcccgatacctctcaaggaaaatctcgaatt-ggatcctaaattgacgggttagtgt 1509
               |||||||||||||||| |||||||||||||||||| |||||| ||||||||||||||||||
tobac: 101500  ccttcccgatacctcccaaggaaaatctcgaatttggatcccaaattgacgggttagtgt 101559

LCV1:  1510    gagcttatccatgcggttatgcactcttcgaataggaatccattttctgaaagatcctgg 1569
               |||||||||||||||||||||||||||| |||||||||||| ||||||||||||||||||
tobac: 101560  gagcttatccatgcggttatgcactctttgaataggaatccgttttctgaaagatcctgg 101619

LCV1:  1570    ctttcgtgctttggtgggtctccgagatcctttcgatgacctatgttgtgtttgttgaag 1629
               ||||||| |||||||||||||||||||||||||||||||||||||         ||||||
tobac: 101620  ctttcgtactttggtgggtctccgagatcctttcgatgacctatg---------ttgaag 101670

LCV1:  1630    ggatatctatataatacgatcgattgcgtaaagcccgcggtagcagtggaaccggggaaa 1689
               |||||||||| |||| |||||||||||||||||||||||||||  ||||||||||||
tobac: 101671  ggatatctatctaatccgatcgattgcgtaaagcccgcggtagcaacggaaccggggaaa 101730

LCV1:  1690    gtatacagaaaagacagttcttttctattatat 1722
               |||||||||||||||||||||||||||||||
tobac: 101731  gtatacagaaaagacagttcttttctattatat 101763

LCV1:  1723    attatattagtcttttctatttaattc                  1749
                         |||||||||
tobac: 101764  tagta     ttttctattatattaagatatattagactatt 101799

LCV1:                1750   atattagattagtcttagttagtgatcccggcttagtgagtcctttcttccgtgatgaac 1809
                            |||||||||||||| |||||||||||||||| ||||||||||          |||||||
tobac:               101800 atattagattagtattagttagtgatcccgacttagtgagtc----------tgatgaat 101849

LCV1:                1810   tgttggcgccagtcctacattttgtctctgtggacagaggagaaaaggggctccgcggga 1869
                            ||||||| |||||||||||||||||||||||||| |||||||||||||||| ||||||
tobac:               101850 tgttggcaccagtcctacattttgtctctgtggaccgaggagaaaaggggctcggcggga 101909

LCV1:                1870   agaggattgtaccgtgagagaagcaaggaggtcaacctctttcaaatatacaacatggat 1929
                            |||||| |||||| ||||||||||||||||||||||||||||||||||||||||||||||
tobac:               101910 agaggagtgtaccatgagagaagcaaggaggtcaacctctttcaaatatacaacatggat 101969
hypothetical protein 127                                                ^^^ I  Y  L  M  S
(SEQ ID NO:4)

LCV1:                1930   tctggcaatgcaatgtacttggactctcatgtcgatccgaatgaatcatcctttccacgg 1989
                            ||||||||||     || ||||||||||||||||||||||||||||||||||||||||||
tobac:               101970 tctggcaatg-----tagttggactctcatgtcgatccgaatgaatcatcctttccacgg 102024
hypothetical protein 123    E  P  L  T       T  P  S  E  H  R  D  S  H  I  M  R  E  V  S
```

Fig. 3-4

(continued)

```
LCV1:                  1990   aggcaaatctttgcctgttaggtaacaggatagcaagttacaaactctgtctcggtagga 2049
                              ||| |||||||||||||| |||| || |||||||||||||| |||| ||||||||||||||||
tobac:                 102025 aggtaaatctttgcctgctaggcaagaggatagcaagttccaaattctgtctcggtagga 102084
hypothetical protein 88         T  F  R  Q  R  S  P  L  L  I  A  L  E  L  N  Q  R  P  L  V

LCV1:                  2050   catggatctctattactatgaatttcataaatgaagtagtgaatggtggggttaccatta 2109
                              |||| || |||||||||||||| |||||||||||||||||| |||||| ||||||||||||
tobac:                 102085 catgtatttctattactatgaaattcataaatgaagtagttaatggtagggttaccatta 102144
hypothetical protein 1                            M  K  F  I  N  E  V  V  N  G  R  V  T  I
(SEQ ID NO:5)
hypothetical protein 68         H  I  E  I  V  I  F  N  M  F  S  T  T  L  P  L  T  V  M  I

LCV1:                  2110   tccttttgtagtgacgaatcctgtatgtgttcctaagaaaaggaatttgtacatttttc 2169
                              ||||||||||||||||||||| |||||||||||||||||||||||||||||| |||||||
tobac:                 102145 tccttttgtagtgacgaatcttgtatgtgttcctaagaaaaggaatttgtccatttttc 102204
hypothetical protein 15      I  L  F  V  V  T  N  L  V  C  V  P  K  K  R  N  L  S  I  F
hypothetical protein 48         R  K  T  T  V  F  R  T  H  T  G  L  F  L  F  K  D  M  K  R

LCV1:                  2170   gggatctcaaaggagcgtggaaacacataagaactcttgaatggaaatggaaaagagatg 2229
                              ||| ||||||||| |||||||||| |||||||||||||      |||||||||||||||
tobac:                 102205 ggggtctcaaaggggcgtggaaacgcataagaactcttg------aatggaaaagagatg 102258
hypothetical protein 35      R  G  L  K  G  A  W  K  R  I  R  T  L        E  W  K  R  D
hypothetical protein 35         P  R  L  P  A  H  F  R  M  L  V  R  S        H  F  L  S  T

LCV1:                  2230   gaactccagttccttcggaaatggtaagatctttggcgcaaaaaaaggggttgatccgta 2289
                              ||||||||||||||||
tobac:                 102259 taactccagttccttcg---------------------------------------- 102275
hypothetical protein 24         V  G  T  G  E
hypothetical protein 53      V  T  P  V  P  S


LCV1                   2290 tcatcttgacttggttctgcttcctctatttttttaataataccgggtcgggttcttctc 2349

Tobac:                      ------------------------------------------------------------


LCV1                   2350 ctacccgtatcgaatagaacacgctgagccaaatcttcttcatgtaaaacctgcttgatt 2409

Tobac:                      ------------------------------------------------------------


LCV1                   2410 tagatcgggaaaatcgtgtggttttatgaaaccatgtgctatggctc 2456

Tobac:                      ---------------------------------------------


LCV1:                    2457   gaatccgtagtcaatcctatttccgatagggacagttgacaactgaatcctatttt-ccc 2515
                                ||||| |||||||||||||||||||||||| |||||||||| ||||||| |||||  ||
tobac:                   102276 gaatcggtagtcaatcctatttccgataggggcagttgacaattgaatccgattttgacc 102335
hypothetical protein 6        S  D  T  T  L  G  I  E  S  L  P  L  Q  C  N  F  G  I  K  V
hypothetical protein 59        E  S  V  V  N  P  I  S  D  R  G  S ^^^

                                                                    PacI/AscI
LCV1:                    2516   attattttcatatccgtaatagtgcgaaaaaaaagattaattaaggcgcgcc 2567
                                ||||||||||||||||||||||||||||| |
tobac:                   102336 attattttcatatccgtaatagtgcgaaaaga-------------------- 102367
hypothetical protein 1        M  I  K  M
```

Fig. 3-5

(continued)

```
LCV1:  2568   aggcccggccccaagttgttcaagaatagtgtcgttgagtttctcgacccctttgccttag 2627
tobac: 102368 aggcccggctccaagttgttcaagaatagtggcgttgagtttctcgacccctttgacttag 102427

LCV1:  2628   gattaatcagttctatttctcgatgggggcagggaagggatataactcaccggtagagtg 2687
tobac: 102428 gattagtcagttctatttctcgatgggg-cggggaagggatataactcagcggtagagtg 102486

LCV1:  2688   tcacccttgacgtggtggaagtcatcagttcgagcctgattatccctaaacccaatgtga 2747
tobac: 102487 tcacc-ttgacgtggtggaagtcatcagttcgagcctgattatccctaagcccaatgtga 102545

LCV1:  2748   gttttgatattttgatttgctaccccgccgtgattgaatgagaatggataagaggctcgt 2807
tobac: 102546 gtttttctagttggatttgctcccccgccgtcgttcaatgagaatggataagaggctcgt 102605

LCV1:  2808   gggattgacgtgaggggcagggatggctatatttctgggagcgaactccgggcgaatat 2867
tobac: 102606 gggattgacgtgaggggcagggatggctatatttctgggagcgaactccgggcgaatat 102665

LCV1:  2868   gaagcgcatggatacaagttaggccttggaatgaaagacaattccgaatccgctttgtct 2927
tobac: 102666 gaagcgcatggatacaagttatgccttggaatgaaagacaattccgaatccgctttgtct 102725

LCV1:  2928   acgaacaaggaagctataagtaatgcaactatgaatctcatggagagttcgatcctggct 2987
tobac: 102726 acgaacaaggaagctataagtaatgcaactatgaatctcatggagagttcgatcctggct 102785

LCV1:  2988   caggatgaacgctggcggcatgcttaacacatgcaagtcggacgggaagtggtgtttcca 3047
tobac: 102786 caggatgaacgctggcggcatgcttaacacatgcaagtcggacgggaagtggtgtttcca 102845

LCV1:  3048   gtggcggacgggtgagtaacgcgtaagaacctgcccttgggaggggaacaacagctggaa 3107
tobac: 102846 gtggcggacgggtgagtaacgcgtaagaacctgcccttgggaggggaacaacagctggaa 102905

LCV1:  3108   acggctgctaataccccgtaggctgaggagcaaaaggaggaatccgcccgaggaggggct 3167
tobac: 102906 acggctgctaataccccgtaggctgaggagcaaaaggaggaatccgcccgaggaggggct 102965

LCV1:  3168   cgcgtctgattagctagttggtgaggtaatagcttaccaaggcgatgatcagtagctggt 3227
tobac: 102966 cgcgtctgattagctagttggtgaggcaatagcttaccaaggcgatgatcagtagctggt 103025

LCV1:  3228   ccgagaggatgatcagccacactgggactgagacacggcccagactcctacgggaggcag 3287
tobac: 103026 ccgagaggatgatcagccacactgggactgagacacggcccagactcctacgggaggcag 103085

LCV1:  3288   cagtggggaattttccgcaatgggcgaaagcctgacggagcaatgccgcgtggaggtaga 3347
tobac: 103086 cagtggggaattttccgcaatgggcgaaagc-tgacggagcaatgccgcgtggaggtaga 103144
```

Fig. 3-6

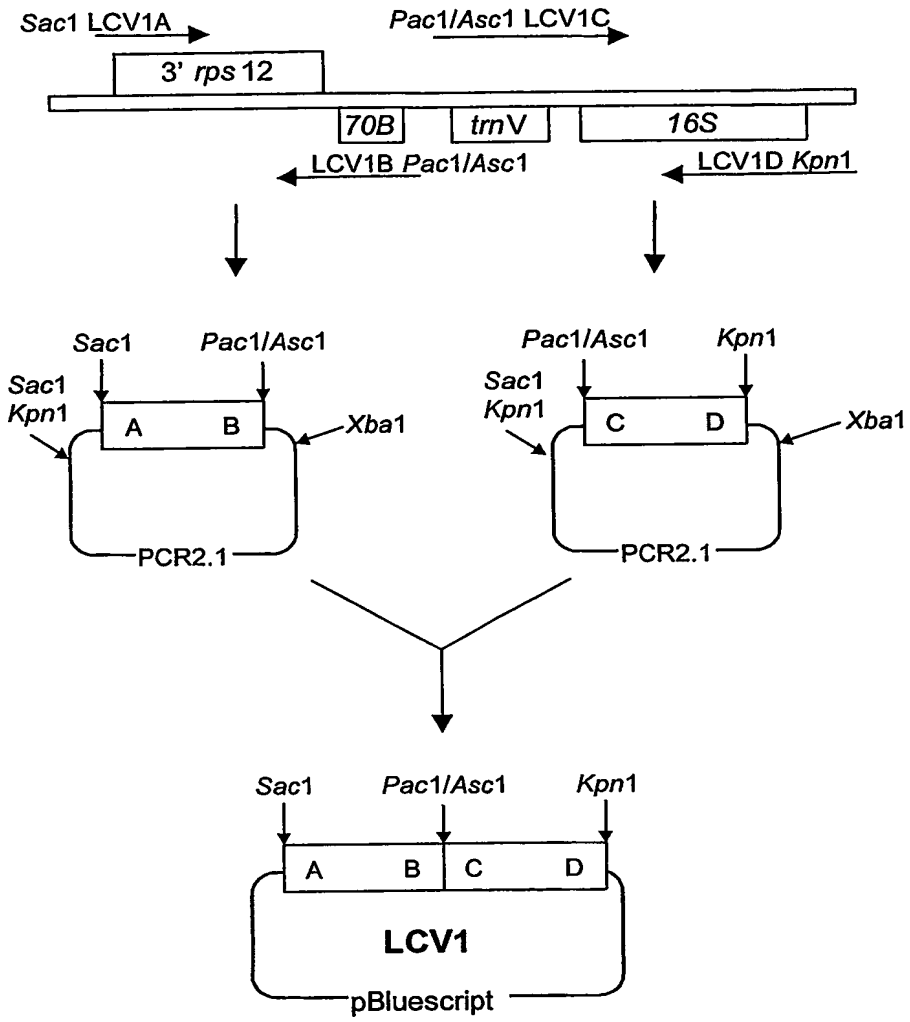
(continued)

```
LCV1:  3348   aggcccacgggtcatgaacttcttttcccggagaagaagcaatgacggtatctggggaat 3407
              ||||||||||||| ||||||||||||||||||||||||||||||||||||||||||||||
tobac: 103145 aggcccacgggtcgtgaacttcttttcccggagaagaagcaatgacggtatctggggaat 103204

LCV1:  3408   aagcatcggctaactctgtgccagcagccgcggtaatacagaggatgcaagcgttatccg 3467
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
tobac: 103205 aagcatcggctaactctgtgccagcagccgcggtaatacagaggatgcaagcgttatccg 103264

LCV1:  3468   gaatgattgggcgtaaagcgtctgtaggtggctttttaagtccgccgtcaaatcccaggg 3527
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
tobac: 103265 gaatgattgggcgtaaagcgtctgtaggtggctttttaagtccgccgtcaaatcccaggg 103324

LCV1:  3528   ctcaactctggacaggcggtggaaactaccaagctggagtacggtaggggcagagggaat 3587
              |||||| ||||||||||||||||||||||||||||||||||||||||||||||||||||
tobac: 103325 ctcaaccctggacaggcggtggaaactaccaagctggagtacggtaggggcagagggaat 103384

LCV1:  3588   ttccggtggagcggtgaaatgcgtagagatcggaaagaacaccaacggccaaagcactct 3647
              |||||||||||||||||||||||||||||||||||||||||||||||| ||||||||||
tobac: 103385 ttccggtggagcggtgaaatgcgtagagatcggaaagaacaccaacggcgaaagcactct 103444

LCV1:  3648   gctgggcccacactgacactgagagacgaaagctaggggagcgaatgggattagataccc 3707
              |||||||| ||||||||||||||||||||||||||||||||||||||||||||||||||||
tobac: 103445 gctgggccgacactgacactgagagacgaaagctaggggagcgaatgggattagataccc 103504

LCV1:  3708   cagtagtcctagccgtaaacgatggatactaggcgctgtgcgtatcgacccgtgcagtgc 3767
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
tobac: 103505 cagtagtcctagccgtaaacgatggatactaggcgctgtgcgtatcgacccgtgcagtgc 103564

LCV1:  3768   tgtagctaacgcgttaagtatcccgcctggggagtacgttcgcaagaatgaaactcaaag 3827
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
tobac: 103565 tgtagctaacgcgttaagtatcccgcctggggagtacgttcgcaagaatgaaactcaaag 103624

LCV1:  3828   gaattgacgggggcccgcacaagcggtggagcatgtggtttaattcgatgcaaagcgaag 3887
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
tobac: 103625 gaattgacgggggcccgcacaagcggtggagcatgtggtttaattcgatgcaaagcgaag 103684

LCV1:  3888   aaccttaccagggcttgacatgccgcgaatcctcttgaaagagaggggtgccttcgggaa 3947
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
tobac: 103685 aaccttaccagggcttgacatgccgcgaatcctcttgaaagagaggggtgccttcgggaa 103744

LCV1:  3948   cgcggacacaggtggtgcatggctgtcgtcagctcgtgccgtaaggtgttgggttaagtc 4007
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
tobac: 103745 cgcggacacaggtggtgcatggctgtcgtcagctcgtgccgtaaggtgttgggttaagtc 103804

LCV1:  4008   ccgcaacgagcgcaaccctcgtgtttagttgccatcattgagtttggaaccctgaacaga 4067
              |||||||||||||||||||||||||||||||||| ||||||||||||||||||||||||
tobac: 103805 ccgcaacgagcgcaaccctcgtgtttagttgccatcgttgagtttggaaccctgaacaga 103864

LCV1:  4068   ctgccggtgataagccggaggaaggtgaggatgacgtcaagtcatcatgcccccttatgcc 4127
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
tobac: 103865 ctgccggtgataagccggaggaaggtgaggatgacgtcaagtcatcatgcccccttatgcc 103924
```

Fig. 3-7

(continued)

```
LCV1:  4128   ctgggcgacacacgtgctacaatggccgggacaaagggtcgcgatcccgcgagggtgagc 4187
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
tobac: 103925 ctgggcgacacacgtgctacaatggccgggacaaagggtcgcgatcccgcgagggtgagc 103984

LCV1:  4188   taaccccaaaaacccgtcctcagttcggattgcaggctgcaactcgcctgcatgaagccg 4247
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
tobac: 103985 taaccccaaaaacccgtcctcagttcggattgcaggctgcaactcgcctgcatgaagccg 104044

LCV1:  4248   gaatcgctagtaatcgccggtcagccatacggcggtgaatccgttcccgggccttgtaca 4307
              |||||||||||||||||||||||||||||||||||| ||||||||||||||||||||
tobac: 104045 gaatcgctagtaatcgccggtcagccatacggcggtgaattcgttcccgggccttgtaca 104104

LCV1:  4308   caccgcccgtcacactatgggagctggccatgcccgaagtcgttaccttaaccgcaagga 4367
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
tobac: 104105 caccgcccgtcacactatgggagctggccatgcccgaagtcgttaccttaaccgcaagga 104164

LCV1:  4368   gggggatgccgaaggcagggctagtgactggagtgaagtcgtaacaaggtagccgtactg 4427
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
tobac: 104165 gggggatgccgaaggcagggctagtgactggagtgaagtcgtaacaaggtagccgtactg 104224

LCV1:  4428   gaaggtgcggctggatcacctccttttcagggagagctaatgcttgttgggtattttggt 4487
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
tobac: 104225 gaaggtgcggctggatcacctccttttcagggagagctaatgcttgttgggtattttggt 104284

LCV1:  4488   ttgacactgcttcacaccc----aaaaaagaagggagctacgtctgagttaaacttggag 4543
              |||||||||||||||||||    ||||||||||||||||||||||||||||||||||||
tobac: 104285 ttgacactgcttcacacccccaaaaaaaagaagggagctacgtctgagttaaacttggag 104344

LCV1:  4544   atggaagtcttcatttcgtttctcgacagtgaagtaagaccaag 4587
              |||||||||||| |||| ||||||||| ||||||||||||||||
tobac: 104345 atggaagtcttc-tttcctttctcgacggtgaagtaagaccaag 104387
```



LCV1A-5'ATGAGCTCGTTCAAGAATCAGTTTTCTT3' (100021-100040 in TCG) **(SEQ ID NO:6)**
LCV1B-5'GGCGCGCCTTAATTAATCTTTTTTTTCGCACTATTACGGATAT3' (102345-102367 in TCG)
(SEQ ID NO:7)
LCV1C-5'TTAATTAAGGCGCGCCAGGCCCGGCCCCAAGTT3' (102368-102384 in TCG) **(SEQ ID NO:8)**
LCV1D-5'ATGGTACCCTTGGTCTTACTTCACTGTCGA3' (104366-104387 in TCG) **(SEQ ID NO:9)**

Fig. 4

Fig. 5

SEQ ID NO:10

TCGACAGTGAAGTAAGACCAAGCTCATGAGCTTATTATCTCAGGTCGGAACAAGTTGATAGGATCCCCCTTTTT
ACGTCCCCATGCCCCCTGTGTGGCGACATGGGGGCGAAAAAAGGAAAGAGAGAGATGGGGTTTCTCTCGCTTTT
GGCATAGTGGGCCCCCAGTGGGGGGCTCGCACGACGGGCTATTAGCTCAGTGGGTAGAGCGCGCCCCTGATAAT
TGCGTCGTTGTGCCTGGGCTGTGAGGGCTCTCAGCCACATGGATAGTTCAATGTGCTCATCGGCGCCTGACCCT
GAGATGTGGATCATCCAAGGCACATTAGCATGGCGTACTCCTCCTGTTCGAACCGGGGTTTGAAACCAAACTTC
TCCTCAGGAGGATAGATGGGGCGATTCAGGTGAGATCCAATGTAGATCCAACTTTCGATTCACTCGTGGGATCC
GGGCGGTCCGGGGGGGACCACCATGGCTCCTCTCTTCTCGAGAATCCATACATCCCTTATCAGTGTATGGACAG
CTATCTCTCGAGCACAGGTTTAGGTTCGGCCTCAATGGGAAAATAAAATGGAGCACCTAACAACGCATCTTCAC
AGACCAAGAACTACGAGATCACCCCTTTCATTCTGGGGTGACGGAGGGATCATACCATTCGAGCCTTTTTTTTT
CATGCTTTTCCCCGAGGTCTGGAGAAAGCTGAAATCAATAGGATTTCCCTAATCCTCCCTTACCGAAAGGAAGA
GCGTGAAATTCTTTTTCCTTTCCGCAGGGACCAGGAGATTGGATCTAGCCGTAAGAAGAATGCTTGGTATAAAT
AACTCACTTCTTGGTCTTCGACCCCCGCAGTCACTACGAACGCCCCCGATCAGTGCAATGGGATGTGTCTATTT
ATCTATCTCTTGACTCGAAATGGGAGCAGGTTTGAAAAAGGATCTTAGAGTGTCTAGGGTTGGGCCAGGAGGGT
CTCTTAACGCCTTCTTTTTTCTTCTCATCGGAGTTATTTCACAAAGACTTGCCATGGTAAGGAAGAAGGGGGGA
ACAGGCACACTTGGAGAGCGCAGTACAACGGAGAGTTGTATGCTGCGTTCGGGAAGGATGAATCGCTCCCGAAA
AGGAATCTATTGATTCTCTCCCAATTGGTTGGACCGTAGGTGCGATGATTTACTTCACGGGCGAGGTCTCTGGT
TCAAGTCCAGGATGGCCCAGCTGCGCCAGGGAAAAGAATAGAAGAAGCGTCAGACTA**TTAATTAAGGCGCGCC**C
ATGCATGCTCCACTTGGCTCGGGGGGATATAGCTCAGTTGGTAGAGCTCCGCTCTTGCAATTGGGTCGTTGCGA
TTACGGGTTGGATGTCTAATTGTCCAGGCGGTAATGATAGTATCTTGTACCTGAACCGGTGGCTCACTTTTTCT
AAGTAATGGGGAAGAGGACCGAAACATGCCACTGAAAGACTCTACTGAGACAAAGATGGGCTGTCAAGAACGTC
AAGAACGTAGAGGAGGTAGGATGGGCAGTTGGTCAGATCTAGTATGGATCGTACATGGACGGTAGTTGGAGTCG
GCGGCTCTCCTAGGGTTCCCTTATCGGGGATCCCTGGGGAAGAGGATCAAGTTGGCCCTTGCGAACAGCTTGAT
GCACTATCTCCCTTCAACCCTTTGAGCGAAATGCGGCAAAAGGAAGGAAAATCCATGGACCGACCCCATCATCT
CCACCCCGTAGGAACTACGAGATTACCCCAAGGACGCCTTCGGCATCCAGGGGTCACGGACCGACCATAGAACC
CTGTTCAATAAGTGGAACGCATTAGCTGTCCGCTCTCAGGTTGGGCAGTAAGGGTCGGAGAAGGGCAATCACTC
ATTCTTAAAACCAGCGTTCTTAAGGCCAAAGAGTCGGCGGAAAAGGGGGGAAAGCTCTCCGTTCCTGGTTTCCT
GTAGCTGGATCCTCCGGAACCACAAGAATCCTTAGTTAGAATGGGATTCCAACTCAGCACCTTTTGAGTGAGAT
TTTGAGAAGAGTTGCTCTTTGGAGAGCACAGTACGATGAAAGTTGTAAGCTGTGTTCGGGGGGGAGTTATTGTC
TATCGTTGGCCTCTATGGTAGAATCAGTCGGGGGACCTGAGAGGCGGTGGTTTACCCTGCGGCGGATGTCAGCG
GTTCGAGTCCGCTTATCTCCAACTCGTGAACTTAGCCGATACAAAGCTATATGACAGCACCCAATTTTTCCGAT
TTGGCGGTTCGATCTATGATTTATCATTCATG

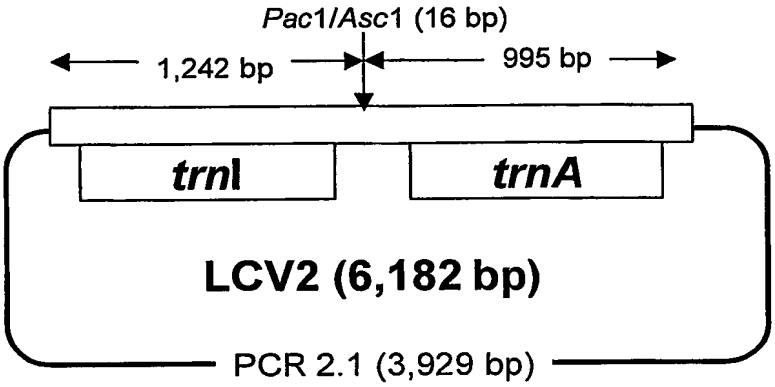

Pac1/Asc1 (16 bp)
1,242 bp
995 bp
trnI
trnA
LCV2 (6,182 bp)
PCR 2.1 (3,929 bp)

Fig. 6

Fig. 7-1

```
LCV2 : 1       tcgacagtgaagtaagaccaagctcatgagcttattatctcaggtcggaacaagttgata 60
SEQ ID NO:11   ||||| ||||||||||||||||||||||||||||||||  ||||||||||||||||||||
tobac: 104366 tcgacggtgaagtaagaccaagctcatgagcttattatcctaggtcggaacaagttgata 104425
SEQ ID NO:12

LCV2 : 61      ggatccccctttttacgtccccatg--ccccctgtgtggcgacatgggggcgaaaaaagg 118
               ||| |||| ||||||||||||||||  ||||| ||||||||||||||||||||||||||
tobac: 104426 ggacccccttttttacgtccccatgttcccccccgtgtggcgacatgggggcgaaaaaagg 104485

LCV2 : 119     aaagagagagatggggtttctctcgcttttggcatagtgggcccccagtgggggctcgc 178
               |||||||| |||||||||||||||||||||||||||| |||||||||||||| |||||||
tobac: 104486 aaagagagggatggggtttctctcgcttttggcatagcgggcccccagtgggaggctcgc 104545

LCV2 : 179     acgacgggctattagctcagtgggtagagcgcgcccctgataattgcgtcgttgtgcctg 238
               |||||||||||||||||||||| ||||||||||||||||||||||||||||||||||||
tobac: 104546 acgacgggctattagctcagtgg-tagagcgcgcccctgataattgcgtcgttgtgcctg 104604

LCV2 : 239     ggctgtgagggctctcagccacatggatagttcaatgtgctcatcggcgcctgaccctga 298
               ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
tobac: 104605 ggctgtgagggctctcagccacatggatagttcaatgtgctcatcggcgcctgaccctga 104664

LCV2 : 299     gatgtggatcatccaaggcacattagcatggcgtactcctcctgttcgaaccggggtttg 358
               ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
tobac: 104665 gatgtggatcatccaaggcacattagcatggcgtactcctcctgttcgaaccggggtttg 104724

LCV2 : 359     aaaccaaacttctcctcaggaggatagatggggcgattcaggtgagatccaatgtagatc 418
               |||||||||| |||||||||||||||||||||||||| ||||||||||||||||||||
tobac: 104725 aaaccaaactcctcctcaggaggatagatggggcgattcgggtgagatccaatgtagatc 104784

LCV2 : 419     caactttcgattcactcgtgggatccgggcggtccgggggggaccaccatggctcctctc 478
               |||||||||||||||||||||||||||||||||||||       ||||||| ||||||||||
tobac: 104785 caactttcgattcactcgtgggatccgggcggtccgggggggaccaccacggctcctctc 104844

LCV2 : 479     ttctcgagaatccatacatcccttatcagtgtatggacagctatctctcgagcacaggtt 538
               ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
tobac: 104845 ttctcgagaatccatacatcccttatcagtgtatggacagctatctctcgagcacaggtt 104904

LCV2 : 539     taggttcggcctcaatgggaaaataaaatggagcacctaacaacgcatcttcacagacca 598
               |||         ||||||||||||||||||||||||||||||||||||||||||||||||
tobac: 104905 tag---------caatgggaaaataaaatggagcacctaacaacgcatcttcacagacca 104955

LCV2 : 599     agaactacgagatcacccctttcattctggggtgacggagggatcataccattcgagcc 657
               |||||||||||||| ||||||||||||||||||||||||||||| ||||||||||||||
tobac: 104956 agaactacgagatcgccccttttcattctggggtgacggagggatcgtaccattcgagcc 105014

LCV2 : 658     ttttttttttcatgcttttccccgaggtctggagaaagctgaaatcaataggatttcccta 717
               |||||||
tobac: 105015 gttttttt------------------------------------------------------ 105021

atcctcccttaccgaaaggaagagcgtgaaattctttttccttttccgcagggaccaggagattggatctagccgtaagaagaatgcttg
gtataaataactcacttcttggtcttcgacccccgcagtcactacgaacgcccccgatcagtgcaatgggatgtgtctatttatctatc
895
(231 bp present in lettuce maize, rice and soybean but not tobacco)
```

Fig. 7-2

```
(continued)
LCV2 : 896    tcttgactcgaaatgggagcaggtttgaaaaaggatcttagagtgtctagggttgggcca 955
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
tobac: 105022 tcttgactcgaaatgggagcaggtttgaaaaaggatcttagagtgtctagggttgggcca 105081

LCV2 : 956    ggagggtctcttaacgccttctttttttcttctcatcggagttatttcacaaagacttgcc 1015
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
tobac: 105082 ggagggtctcttaacgccttctttttttcttctcatcggagttatttcacaaagacttgcc 105141

LCV2 : 1016   atggtaaggaagaaggggggaacaggcacacttggagagcgcagtacaacggagagttgt 1075
              | ||||||||||||||||||||||| ||||||||||||||||||||||||||||||||||||
tobac: 105142 agggtaaggaagaaggggggaacaagcacacttggagagcgcagtacaacggagagttgt 105201

LCV2 : 1076   atgctgcgttcgggaaggatgaatcgctcccgaaaaggaatctattgattctctcccaat 1135
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
tobac: 105202 atgctgcgttcgggaaggatgaatcgctcccgaaaaggaatctattgattctctcccaat 105261

LCV2 : 1136   tggttggaccgtaggtgcgatgatttacttcacgggcgaggtctctggttcaagtccagg 1195
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
tobac: 105262 tggttggaccgtaggtgcgatgatttacttcacgggcgaggtctctggttcaagtccagg 105321

                                                          Pac1/Asc1
LCV2 : 1196   atggcccagctgcgccagggaaaagaatagaagaagcgtcagactcc<u>ttaattaaggcgcgcc</u> 1258
              |||||||||||||||||||||||||||||||||||| || |||| |||
tobac: 105322 atggcccagctgcgccagggaaaagaatagaagaagcatctgactactt--------------105370

LCV2 : 1259   catgcatgctccacttggctcgggggatatagctcagttggtagagctccgctcttgca 1318
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
tobac: 105371 catgcatgctccacttggctcgggggatatagctcagttggtagagctccgctcttgca 105430

LCV2 : 1319   attgggtcgttgcgattacgggttggatgtctaattgtccaggcggtaatgatagtatct 1378
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
tobac: 105431 attgggtcgttgcgattacgggttggatgtctaattgtccaggcggtaatgatagtatct 105490

LCV2 : 1379   tgtacctgaaccggtggctcacttttctaagtaatggggaagaggaccgaaacatgcca 1438
              |||||||||||||||||||||||||||||||||||||||||||||||||||||| |||||
tobac: 105491 tgtacctgaaccggtggctcacttttctaagtaatggggaagaggaccgaaacgtgcca 105550

LCV2 : 1439   ctgaaagactctactgagacaaagatgggctgtcaagaacgtcaagaacgtagaggaggt 1498
              |||||||||||||||||||||||||||||||||||||||||         ||||||||||||
tobac: 105551 ctgaaagactctactgagacaaagatgggctgtcaagaa---------cgtagaggaggt 105601

LCV2 : 1499   aggatgggcagttggtcagatctagtatggatcgtacatggacggtagttggagtcggcg 1558
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
tobac: 105602 aggatgggcagttggtcagatctagtatggatcgtacatggacggtagttggagtcggcg 105661

LCV2 : 1559   gctctcctagggttcccttatcggggatccctggggaagaggatcaagttggcccttgcg 1618
              ||||||| |||||||||| ||| | |||| ||||||||||||||||||||||||||||||
tobac: 105662 gctctcccagggttcccttatcggggatccctggggaagaggatcaagttggcccttgcg 105721

LCV2 : 1619   aacagcttgatgcactatctcccttcaacccttgagcgaaatgcggc-----aaaagga 1673
              ||||||||||||||||||||||||||||||||||||||||||||||     |||||||
tobac: 105722 aacagcttgatgcactatctcccttcaacccttgagcgaaatgcggcaaaagaaaagga 105781
```

Fig. 7-3

(continued)
LCV2 : 1674 aggaaaatccatggaccgaccccatcatctccaccccgtaggaactacgagattacccca 1733
tobac: 105782 aggaaaatccatggaccgaccccatcatctccaccccgtaggaactacgagatcacccca 105841

LCV2 : 1734 aggacgccttcggcatccaggggtcacggaccgaccatagaaccctgttcaataagtgga 1793
tobac: 105842 aggacgccttcggcatccaggggtcacggaccgaccatagaaccctgttcaataagtgga 105901

LCV2 : 1794 acgcattagctgtccgctctcaggttgggcagtaagggtcggagaagggcaatcactcat 1853
tobac: 105902 acgcattagctgtccgctctcaggttgggcagtcagggtcggagaagggcaatgactcat 105961

LCV2 : 1854 tctta 1858
tobac: 105962 t---- 105962

LCV21859aaaccagcgttcttaaggccaaagagtcggcggaaaaggggggaaagctctccgttcctggtttcctgtagctggatcctc
cggaaccacaagaatc 1955 (97 bp sequence absent in tobacco but present in spinach, Solanum
nigrum, Arabidopsis, Soybean, rice and wheat)

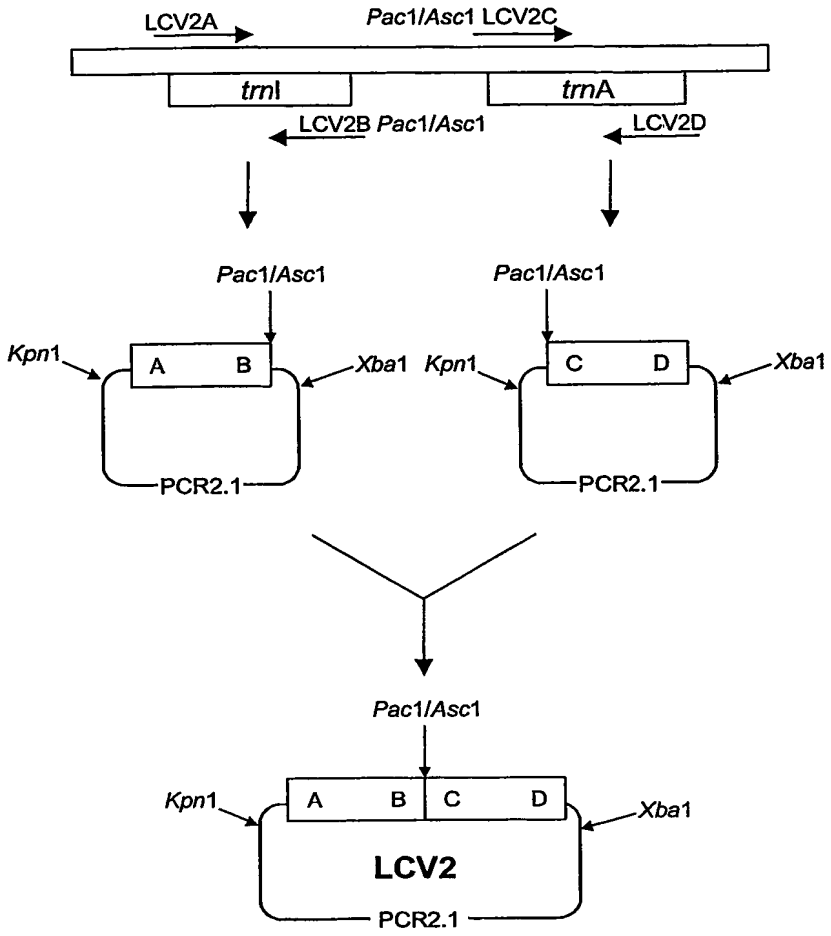
LCV2 : 1956 cttagttagaatgggattccaactcagcacctttgagtgagattttgagaagagttgct 2015
tobac: 105963 cttagttagaatgggattccaactcagcacctttgagtgagattttgagaagagttgct 106022

LCV2 : 2016 ctttggagagcacagtacgatgaaagttgtaagctgtgttcgggggggagttattgtcta 2075
tobac: 106023 ctttggagagcacagtacgatgaaagttgtaagctgtgttcgggggggagttattgtcta 106082

LCV2 : 2076 tcgttggcctctatggtagaatcagtcgggggacctgagaggcggtggtttaccctgcgg 2135
tobac: 106083 tcgttggcctctatggtagaatcagtcgggggacctgagaggcggtggtttaccctgcgg 106142

LCV2 : 2136 cggatgtcagcggttcgagtccgcttatctccaactcgtgaacttagccgatacaaagct 2195
tobac: 106143 cggatgtcagcggttcgagtccgcttatctccaactcgtgaacttagccgatacaaagct 106202

LCV2 : 2196 atatgacagcacccaatttttccgatttggcggttcgatctatgatttatcattcatg 2253
tobac: 106203 ttatgatagcacccaatttttccgattcggcggttcgatctatgatttatcattcatg 106260



LCV2A 5'TCGACAGTGAAGTAAGACCAAG3' (104366-104387 in TCG) **(SEQ ID NO:13)**
LCV2B 5'GGCGCGCCTTAATTAAGGAGTCAGACGCTTCTTCTATTC3' (10346-105370 in TCG)
(SEQ ID NO:14)
LCV2C 5'TTAATTAAGGCGCGCCCATGCATGCTCCACTTGGCTCGG3'(105371-105393 in TCG)
(SEQ ID NO:15)
LCV2D 5'CATGAATGATAAATCATAGATCGAAC3' (106234-106260 in TCG) **(SEQ ID NO:16)**

Fig. 8

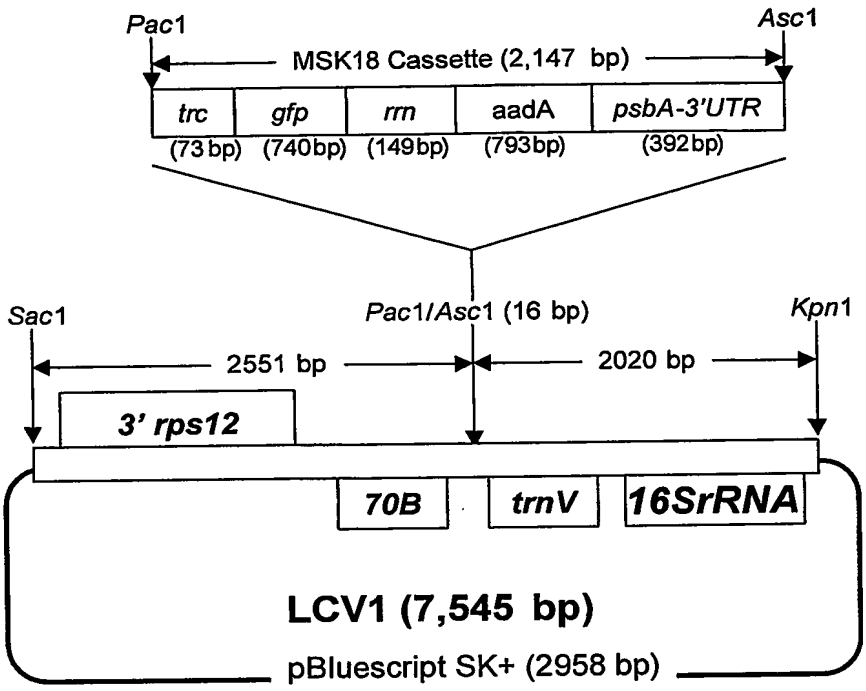

LCV1-MSK18 map (9,682bp)
Pac1
Asc1
MSK18 Cassette (2,147 bp)
trc
gfp
rrn
aadA
psbA-3'UTR
(73 bp)
(740bp)
(149bp)
(793bp)
(392bp)
Sac1
Pac1/Asc1 (16 bp)
Kpn1
2551 bp
2020 bp
3' rps12
70B
trnV
16SrRNA
LCV1 (7,545 bp)
pBluescript SK+ (2958 bp)

Fig. 9

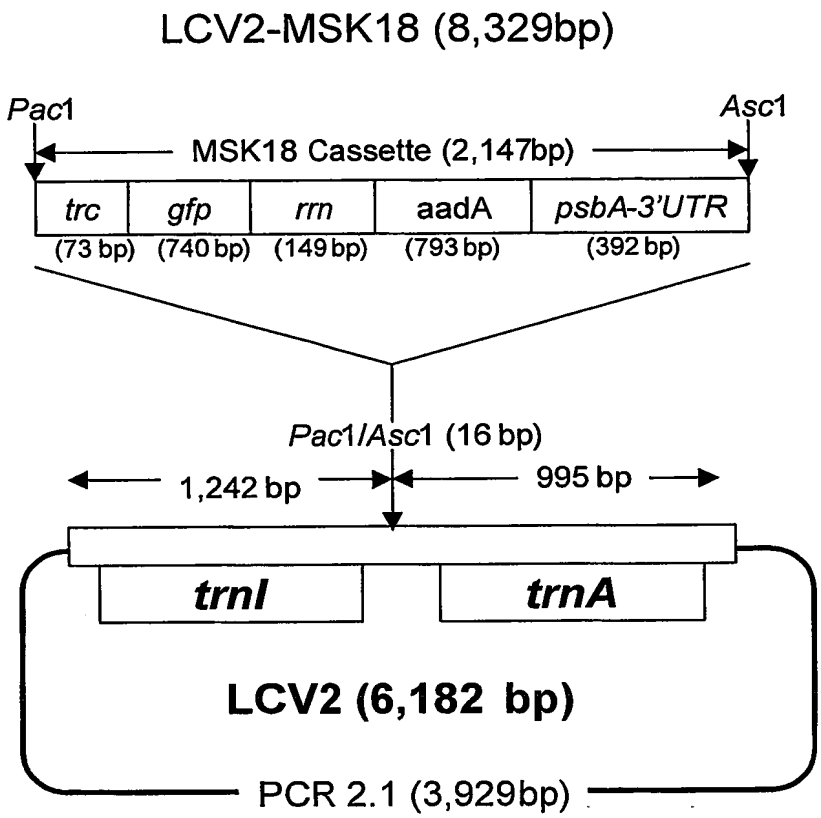
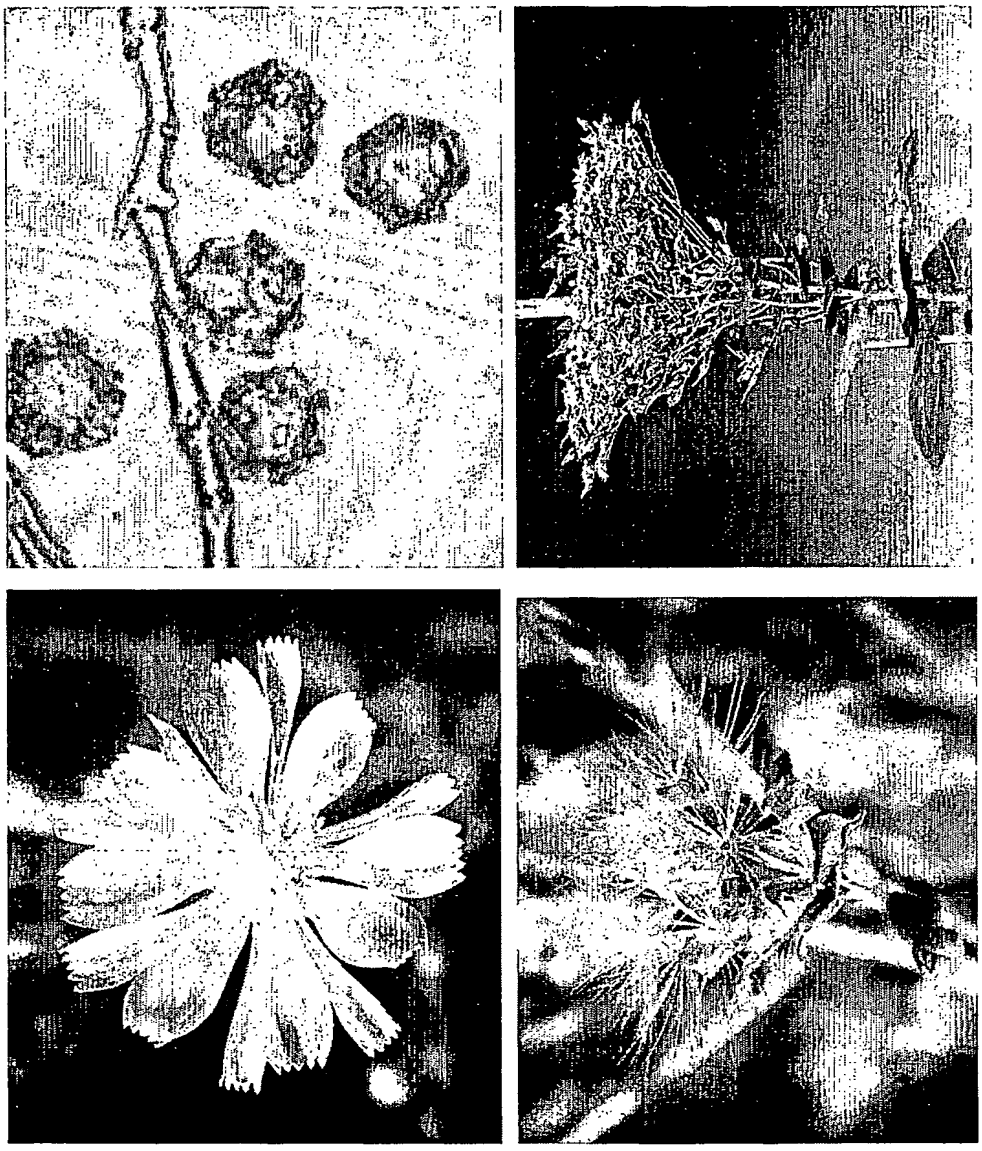
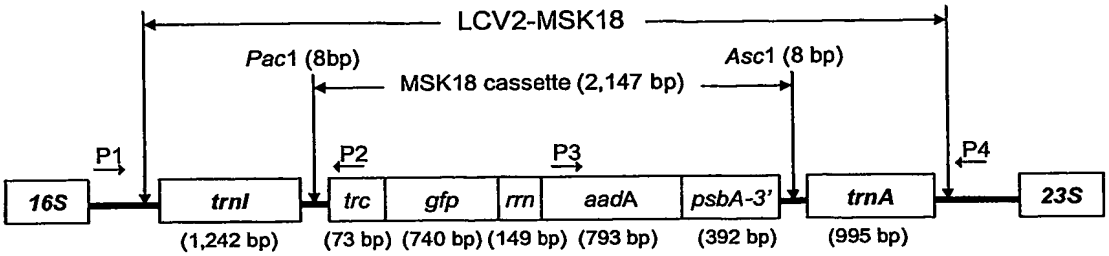

LCV2-MSK18 (8,329bp)
Pac1
Asc1
MSK18 Cassette (2,147bp)
trc
gfp
rrn
aadA
psbA-3'UTR
(73 bp)
(740 bp)
(149 bp)
(793 bp)
(392 bp)
Pac1/Asc1 (16 bp)
1,242 bp
995 bp
trnI
trnA
LCV2 (6,182 bp)
PCR 2.1 (3,929bp)

Fig. 10

Fig. 11





P1 + P2 = 1415 bp
P3 + P4 = 2006 bp
P1 + P4 = 4623 bp

P1 5'-ACTGGAAGGTGCGGCTGGAT-3' (SEQ ID NO:17)
P2 5'-ACGAGCCGGATGATTAATTGTCAATTAATTAACTA-3' (MSK18A comp)- (SEQ ID NO:18)
P3 5'-AAGTCACCATTGTTGTGCACG-3' (starts at 259 bp on *aadA* CDS) (SEQ ID NO:19)
P4 5'-CTCGCCCTTAATTTTAAGGC-3' (SEQ ID NO:20)

Fig. 12

Figure 13

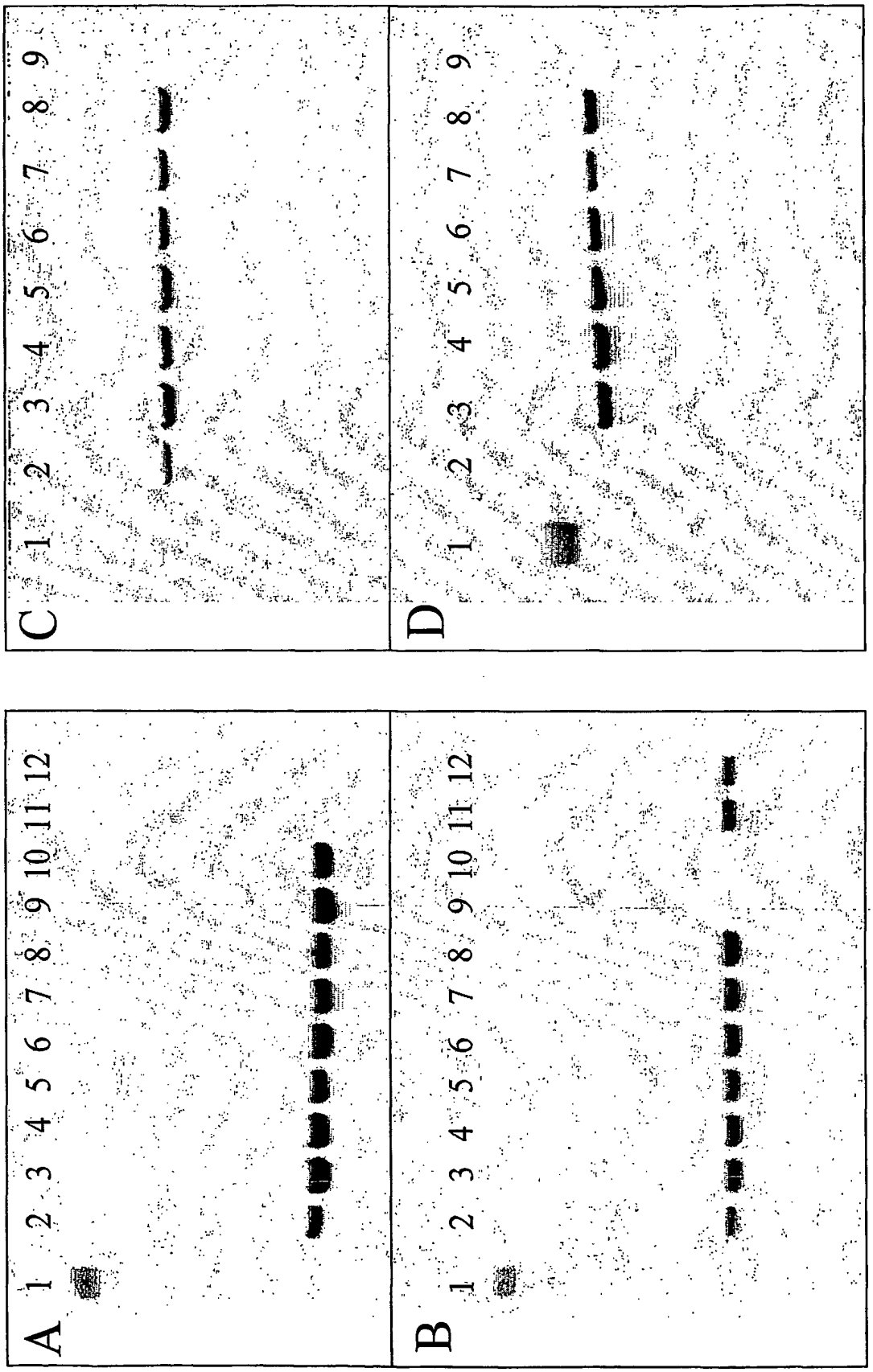

A
1 2 3 4 5 6 7 8 9 10 11 12
B
1 2 3 4 5 6 7 8 9 10 11 12
C
1 2 3 4 5 6 7 8 9
D
1 2 3 4 5 6 7 8 9

Fig. 14-1

P1-P2 left border fragment consensus sequence (SEQ ID NO:21)

Primer P1→
actggaaggtgcggctggatcacctccttttcagggagagctaatgcttgttgggtattttggtttgacac
tgcttcacacccaaaaaagaagggagctacgtctgagttaaacttggagatggaagtcttcatttcgtttc
Primer LCV2A→=LCV2A left border
TCGACAGTGAAGTAAGACCAAGCTCATGAGCTTATTATCTCAGGTCGGAACAAGTTGATAGGATCCCCCTT
TTTACGTCCCCATGCCCCCTGTGTGGCGACATGGGGGCGAAAAAAGGAAAGAGAGAGATGGGGTTTCTCTC
GCTTTTGGCATAGTGGGCCCCCAGTGGGGGGCTCGCACGACGGGCTATTAGCTCAGTGGGTAGAGCGCGCC
CCTGATAATTGCGTCGTTGTGCCTGGGCTGTGAGGGCTCTCAGCCACATGGATAGTTCAATGTGCTCATCG
GCGCCTGACCCTGAGATGTGGATCATCCAAGGCACATTAGCATGGCGTACTCCTCCTGTTCGAACCGGGGT
TTGAAACCAAACTTCTCCTCAGGAGGATAGATGGGGCGATTCAGGTGAGATCCAATGTAGATCCAACTTTC
GATTCACTCGTGGGATCCGGGCGGTCCGGGGGGGACCACCATGGCTCCTCTCTTCTCGAGAATCCATACAT
CCCTTATCAGTGTATGGACAGCTATCTCTCGAGCACAGGTTTAGGTTCGGCCTCAATGGGAAAATAAAATG
GAGCACCTAACAACGCATCTTCACAGACCAAGAACTACGAGATCACCCCTTTCATTCTGGGGTGACGGAGG
GATCATACCATTCGAGCCTTTTTTTTTCATGCTTTTCCCCGAGGTCTGGAGAAAGCTGAAATCAATAGGAT
TTCCCTAATCCTCCCTTACCGAAAGGAAGAGCGTGAAATTCTTTTTCCTTTCCGCAGGGACCAGGAGATTG
GATCTAGCCGTAAGAAGAATGCTTGGTATAAATAACTCACTTCTTGGTCTTCGACCCCCGCAGTCACTACG
AACGCCCCCGATCAGTGCAATGGGATGTGTCTATTTATCTATCTCTTGACTCGAAATGGGAGCAGGTTTGA
AAAAGGATCTTAGAGTGTCTAGGGTTGGGCCAGGAGGGTCTCTTAACGCCTTCTTTTTTCTTCTCATCGGA
GTTATTTCACAAAGACTTGCCATGGTAAGGAAGAAGGGGGGAACAGGCACACTTGGAGAGCGCAGTACAAC
GGAGAGTTGTATGCTGCGTTCGGGAAGGATGAATCGCTCCCGAAAAGGAATCTATTGATTCTCTCCCAATT
GGTTGGACCGTAGGTGCGATGATTTACTTCACGGGCGAGGTCTCTGGTTCAAGTCCAGGATGGCCCAGCTG
*Pac*1 *trc* promoter→ ←Primer P2
CGCCAGGGAAAAGAATAGAAGAAGCGTCTGACTCC[TTAATTAA][TTGACAATTAATCATCCGGCTCGT]

P3-P6 left border fragment consensus sequence (SEQ ID NO:22)

Primer P3→(*aadA* gene)
AAGTCACCATTGTTGTGCACGACGACATCATTCCGTGGCGTTATCCAGCTAAGCGCGAACTGCAATTTGGA
GAATGGCAGCGCAATGACATTCTTGCAGGTATCTTCGAGCCAGCCACGATCGACATTGATCTGGCTATCTT
GCTGACAAAAGCAAGAGAACATAGCGTTGCCTTGGTAGGTCCAGCGGCGGAGGAACTCTTTGATCCGGTTC
CTGAACAGGATCTATTTGAGGCGCTAAATGAAACCTTAACGCTATGGAACTCGCCGCCCGACTGGGCTGGC
GATGAGCGAAATGTAGTGCTTACGTTGTCCCGCATTTGGTACAGCGCAGTAACCGGCAAAATCGCGCCGAA
GGATGTCGCTGCCGACTGGGCAATGGAGCGCCTGCCGGCCCAGTATCAGCCCGTCATACTTGAAGCTAGAC
AGGCTTATCTTGGACAAGAAGAAGATCGCTTGGCCTCGCGCGCAGATCAGTTGGAAGAATTTGTCCACTAC
aadA stop/*psbA* 3′UTR→
GTGAAAGGCGAGATCACCAAGGTAGTCGGCAAATAATGTCTAGAGCGATCCTGGCCTAGTCTATAGGAGGT
TTTGAAAAGAAAGGAGCAGTAATCATTTTCTTGTTCTATCAAGAGGGTGCTATTGCTCCTTTCTTTTTTTC
TTTTTATTTATTTACTAGTATTTTACTTACATAGACTTTTTTGTTTACATTATAGAAAAAGAAGGAGAGGT
TATTTTCTTGCATTTATTCATGATTGAGTATTCTATTTTGATTTTGTATTTGTTTAAAATTGTAGAAATAG
AACTTGTTTCTCTTCTTGCTAATGTTACTATATCTTTTTGATTTTTTTTTCCAAAAAAAAAATCAAATTTT
GACTTCTTCTTATCTCTTATCTTTGAATATCTCTTATCTTTGAAATAATAATATCATTGAAATAAGAAAGA
*Asc*1 *trnA* gene→
AGAGCTATATTCGA[GGCGCGCC]CATGCATGCTCCACTTGGCTCGGGGGGATATAGCTCAGTTGGTAGA
GCTCCGCTCTTGCAATTGGGTCGTTGCGATTACGGGTTGGATGTCTAATTGTCCAGGCGGTAATGATAGTA
TCTTGTACCTGAACCGGTGGCTCACTTTTTCTAAGTAATGGGGAAGAGGACCGAAACATGCCACTGAAAGA
CTCTACTGAGACAAAGATGGGCTGTCAAGAACGTCAAGAACGTAGAGGAGGTAGGATGGGCAGTTGGTCAG
ATCTAGTATGGATCGTACATGGACGGTAGTTGGAGTCGGCGGCTCTCCTAGGGTTCCCTTATCGGGGATCC

Fig. 14-2

(continued)
CTGGGGAAGAGGATCAAGTTGGCCCTTGCGAACAGCTTGATGCACTATCTCCCTTCAACCCTTTGAGCGAA
ATGCGGCAAAAGGAAGGAAAATCCATGGACCGACCCCATCATCTCCACCCCGTAGGAACTACGAGATTACC
CCAAGGACGCCTTCGGCATCCAGGGGTCACGGACCGACCATAGAACCCTGTTCAATAAGTGGAACGCATTA
GCTGTCCGCTCTCAGGTTGGGCAGTAAGGGTCGGAGAAGGGCAATCACTCATTCTTAAAACCAGCGTTCTT
AAGGCCAAAGAGTCGGCGGAAAAGGGGGGAAAGCTCTCCGTTCCTGGTTTCCTGTAGCTGGATCCTCCGGA
ACCACAAGAATCCTTAGTTAGAATGGGATTCCAACTCAGCACCTTTTGAGTGAGATTTTGAGAAGAGTTGC
TCTTTGGAGAGCACAGTACGATGAAAGTTGTAAGCTGTGTTCGGGGGGGAGTTATTGTCTATCGTTGGCCT
CTATGGTAGAATCAGTCGGGGGACCTGAGAGGCGGTGGTTTACCCTGCGGCGGATGTCAGCGGTTCGAGTC
trnA end
CGCTTATCTCCAACTCGTGAACTTAGCCGATACAAAGCTATATGACAGCACCCAATTTTTCCGATTTGGCG
←Primer LCV2D = RB of LCV2
gttcgatctatgatttatcattcatggacgttgataagatccatccatttagcagcaccttaggatggcat
←Primer P6
a**gccttaaaattaagggcgag**

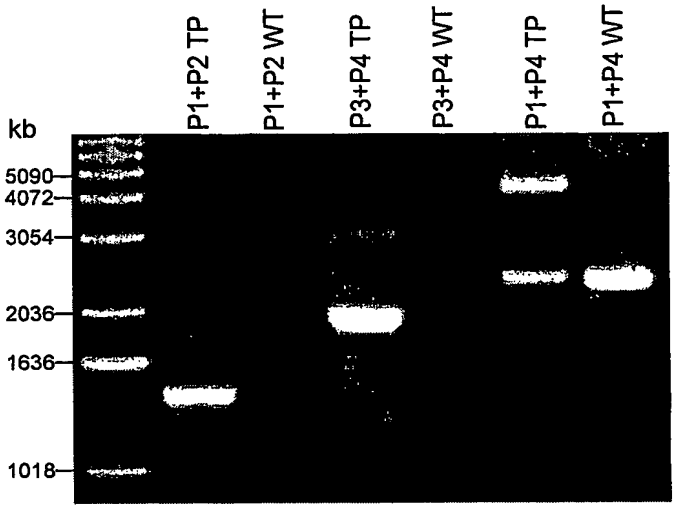

P1+P2 TP
P1+P2 WT
P3+P4 TP
P3+P4 WT
P1+P4 TP
P1+P4 WT
kb
5090
4072
3054
2036
1636
1018

Fig. 15

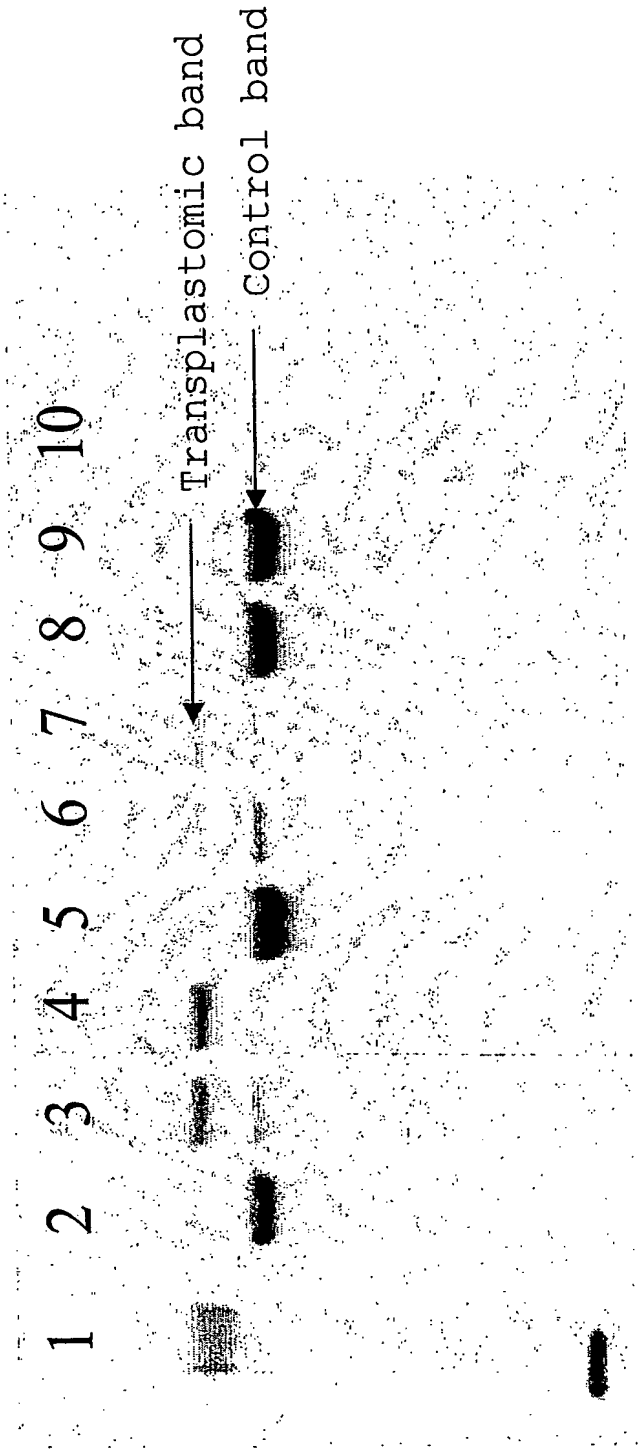


Fig. 16

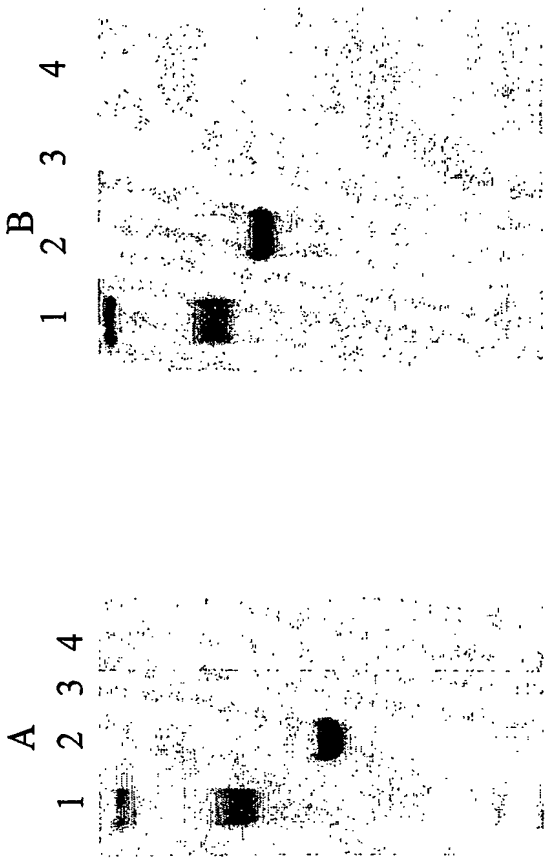
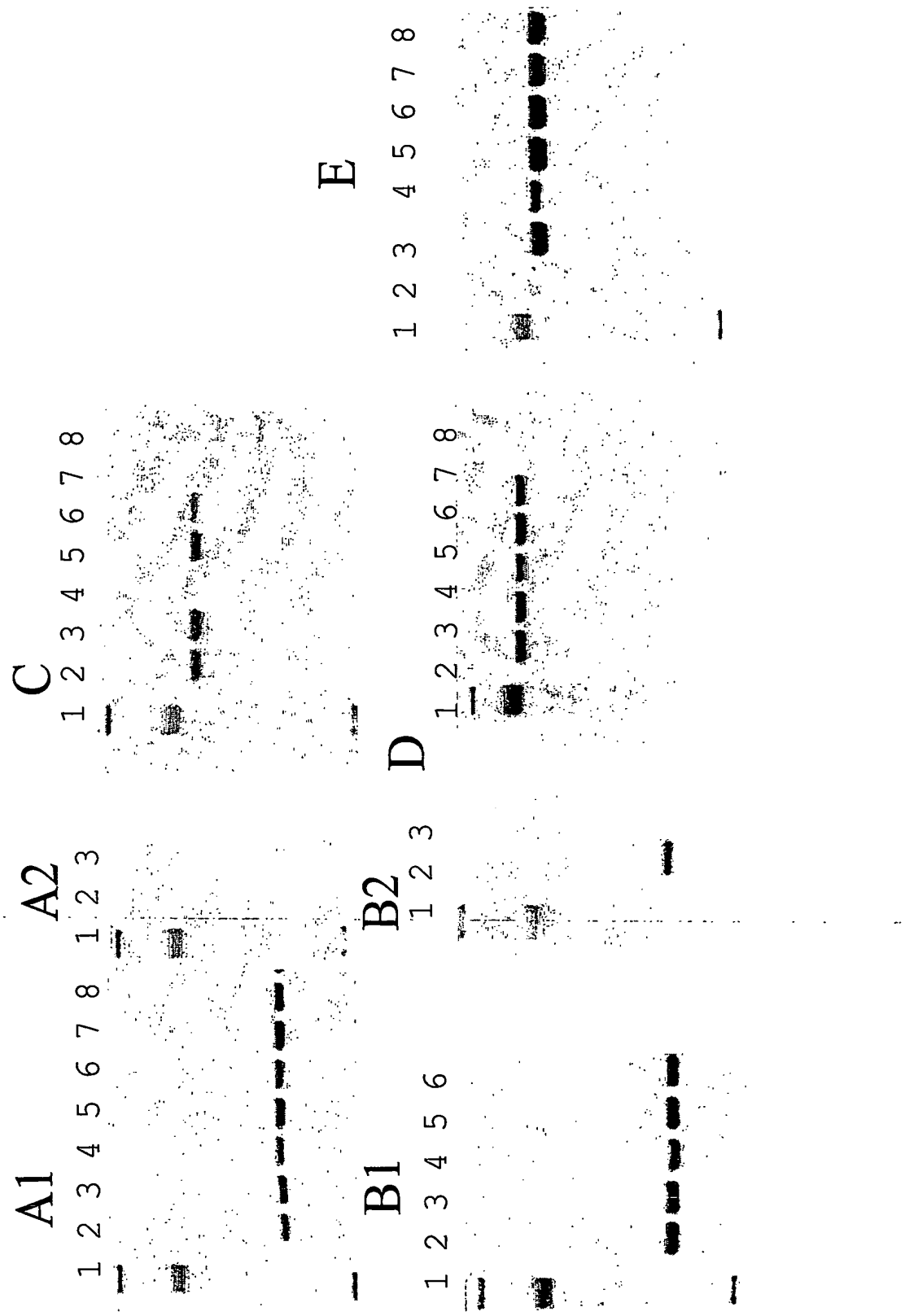


Fig. 17

Fig. 18


A1
1 2 3 4 5 6 7 8
A2
1 2 3
B1
1 2 3 4 5 6
B2
1 2 3
C
1 2 3 4 5 6 7 8
D
1 2 3 4 5 6 7 8
E
1 2 3 4 5 6 7 8

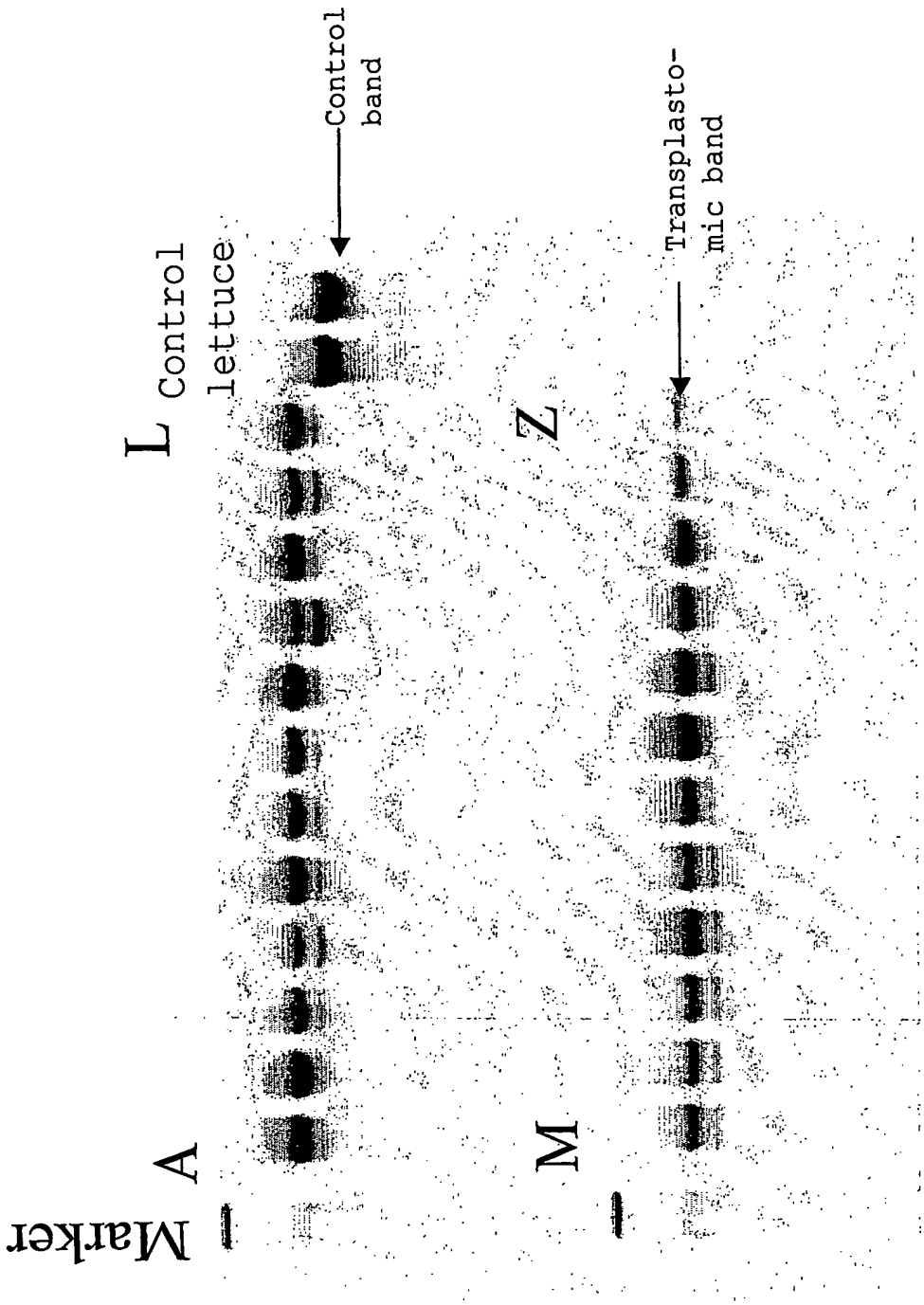

Marker
A
L Control lettuce
M
Z
Control band
Transplasto-mic band

Fig. 19

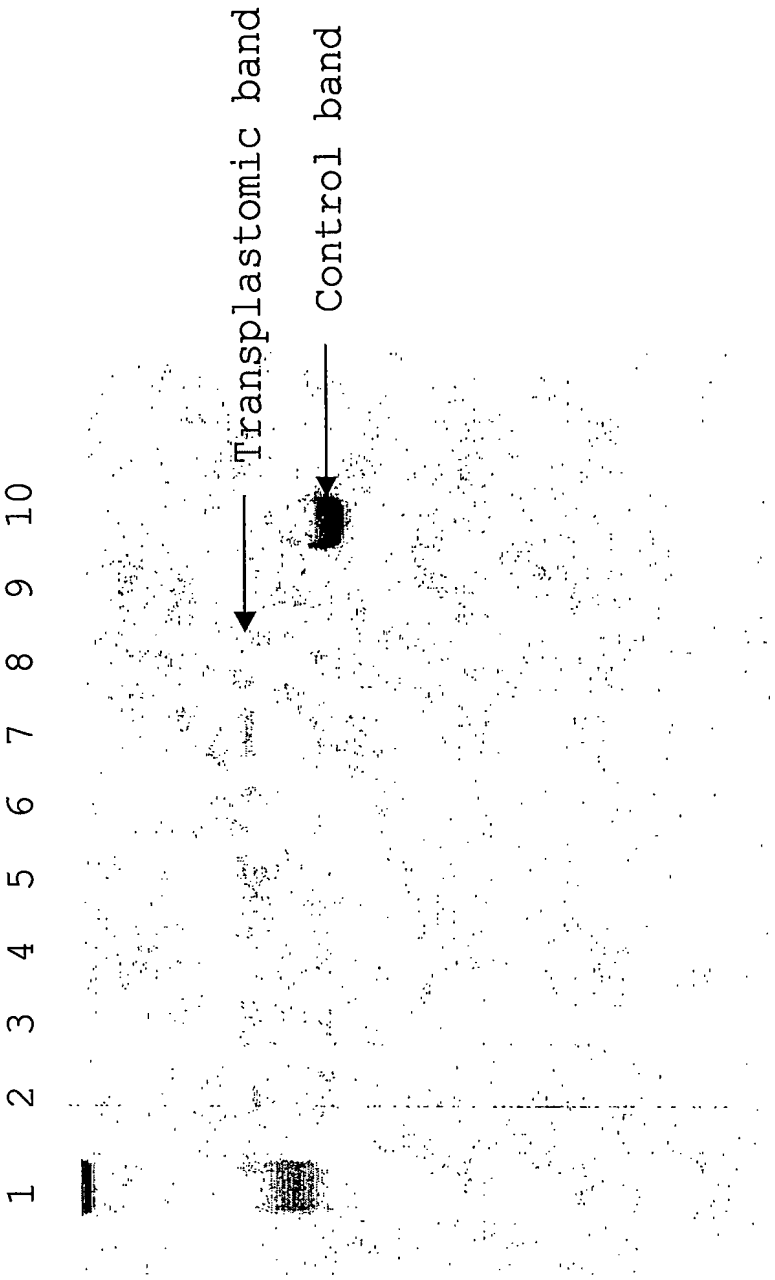
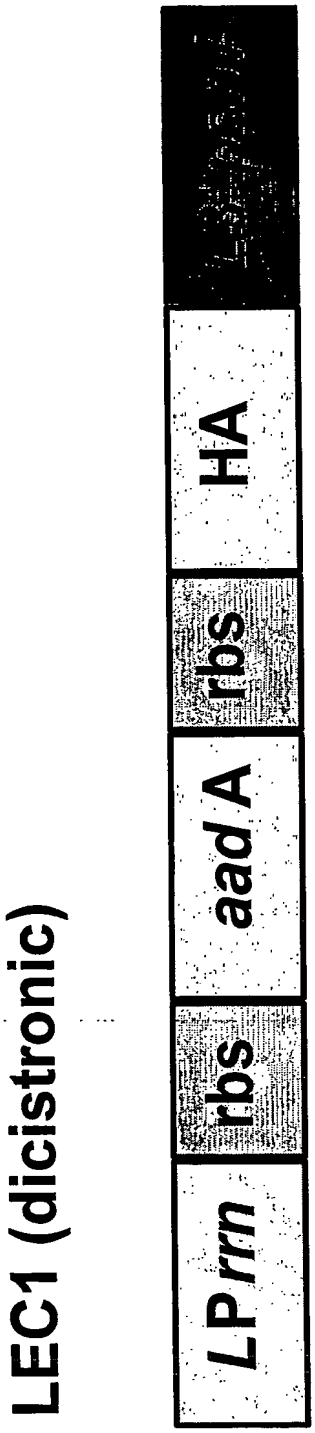
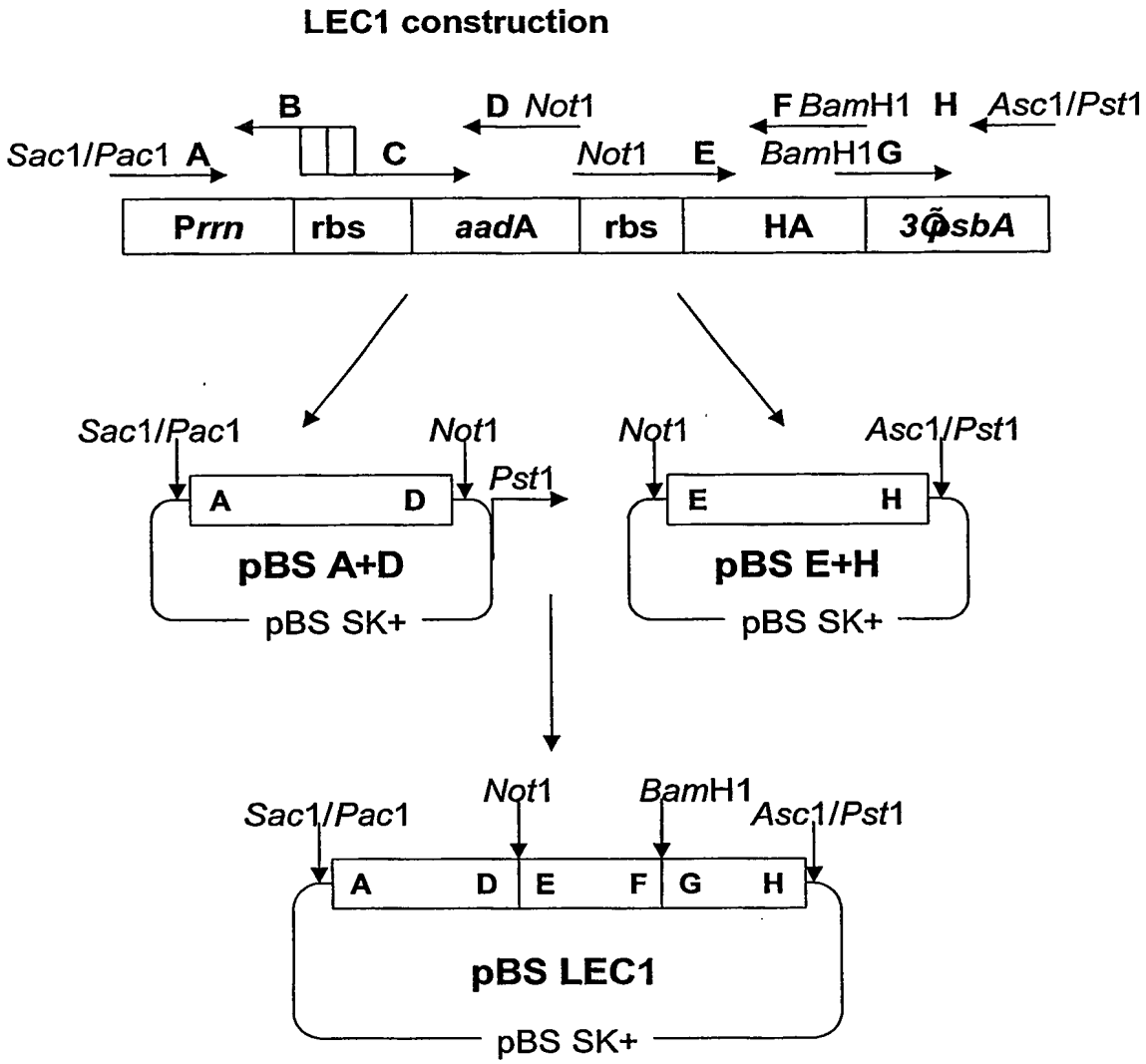


Fig. 20

Fig. 21





List of PCR primers used in LEC1 construction:

LEC1 A	tcg agc tct taa tta agc tac ccc gcc gtg att gaa tga gaa t **(SEQ ID NO:23)**
LEC1 B	aaa tcc ctc cct aca act gta tcc aag cgc ttc gta ttc gc **(SEQ ID NO:24)**
LEC1 C	gtt gta ggg agg gat tta tgg cag aag cgg tga tcg ccg aa **(SEQ ID NO:25)**
LEC1 D	tcg cgg ccg ctt att tgc cga cta cct tgg tga t **(SEQ ID NO:26)**
LEC1 E	tcg cgg ccg cag ttg tag gga ggg att tat gca aaa act tcc cgg aaa tga caa **(SEQ ID NO:27)**
LEC1 F	gga tcc tta gta tcc tga ctt cag ctc aac **(SEQ ID NO:28)**
LEC1 G	aac att taa gga tcc gac ttt ggt ctt att gta att gta tag **(SEQ ID NO:29)**
LEC1 H	atc tgc agg gcg gcc atc cac ttg gct aca tcc gcc **(SEQ ID NO:30)**

Fig. 22